Professor Readdy's Official Graham-Schmidt Cheat Sheet

Given $W = \text{span}\{\vec{v}_1, \ldots, \vec{v}_k\}$, Graham-Schmidt will give an orthonormal basis $\{\vec{u}_1, \vec{u}_2, \ldots\}$ for W:

Let

$$\begin{aligned}
\vec{w}_1 &= \vec{v}_1 \\
\vec{w}_2 &= \vec{v}_2 - \text{proj}_{\vec{w}_1}\vec{v}_2 \\
\vec{w}_3 &= \vec{v}_3 - \text{proj}_{\vec{w}_1}\vec{v}_3 - \text{proj}_{\vec{w}_2}\vec{v}_3 \\
\vec{w}_4 &= \vec{v}_4 - \text{proj}_{\vec{w}_1}\vec{v}_4 - \text{proj}_{\vec{w}_2}\vec{v}_4 - \text{proj}_{\vec{w}_3}\vec{v}_4 \\
&\vdots
\end{aligned}$$

where

$$\text{proj}_{\vec{w}}\vec{v} = \frac{\vec{v} \cdot \vec{w}}{\vec{w} \cdot \vec{w}}\ \vec{w}$$

Finally, let

$$\vec{u}_1 = \frac{\vec{w}_1}{|\vec{w}_1|}$$

$$\vec{u}_2 = \frac{\vec{w}_2}{|\vec{w}_2|}$$

$$\vec{u}_3 = \frac{\vec{w}_3}{|\vec{w}_3|}$$

etc.